

Technical Manual for

Space

Fortress

INTRODUCTION TO SPACE FORTRESS

INTRODUCTION

Space Fortress is a one or two player outer space action game designed with features geared for maximum player appeal: a progressively difficult competitive level and a clearly defined "enemy" which must be both attacked and avoided at various points in the course of play.

GAME PLAY

The center of the playfield is occupied by the "Space Fortress" which is programmed to constantly home in on the players' ships. Surrounding the "Space Fortress" are three concentric "energy rings" of twelve segments each which serve as both a protective perimeter for the "Space Fortress" and a source of points for the player. Contained within the "energy rings" are three protective "mines" which seek out the players' ships and destroy them upon collision. The movements of the "mines" are programmed to simulate the actions of heat-seeking missiles.

The object of the games of "Space Fortress" is to score the maximum number of points possible. This is accomplished by the combination of three elements: a) exploding the ring segments; b) exploding the "Space Fortress"; c) avoiding the Space Fortress mines. A player's turn is over when his ship has been destroyed. The number of ships per game is set by the operator.

Points are awarded as follows:

A. Hitting ring segments

1. outer ring-10 points per segment
2. center ring-20 points per segment
3. inner ring- 30 points per segment
(note: it takes two "hits" to destroy a segment)

B. Hitting "Space Fortress"

1. 1,440 points plus extra ship for each hit.

C. Avoiding "mines"

1. No points are awarded for shooting the "mines", but they must be avoided or shot to keep the game going.

For maximum scoring, a player will want to shoot out sections of the energy rings in order to give him a shot at the Space Fortress in the center of the screen. As play progresses, there are two facts a player must keep in mind: 1) exploding all segments in a given ring will cause the entire ring to reappear - thereby eliminating a potential shot at the Space Fortress in the center; and 2) exploding the rings in a manner that gives you a shot at the Space Fortress will also give the Space Fortress a shot at you. The Space Fortress is programmed so that its nose always seeks out the player's ship. If there is a shot at the player, he will take it.

When the Space Fortress is hit by a player's missile, it will first implode and then explode with all remaining ring segments.

After a one-second delay, the Space Fortress will reappear with all three ring segments. If the Space Fortress shoots the player, his turn is over.

MODES OF PLAY

There are two modes of play in Space Fortress: a) The one player mode; and b) the two player mode.

The one player mode is activated when a coin is accepted and the player pushes the one player button. As play begins, the Space Fortress will appear in the center of the screen surrounded by its three "energy rings". The player's ship appears about halfway up on the right hand edge.

By using the control buttons to move forward, right or left, the player maneuvers about the screen using the firing button to launch missiles.

Points are scored by destroying the energy ring segments or the Space Fortress itself. Exploding the Space Fortress gives an extra ship as well as points. No points are given for the "mines" that attack the player.

The player's ship can be destroyed in two ways: by collision with the mines or by a hit from the Space Fortress's torpedo. The mines are launched from the rings and attack the player for approximately ten seconds or until shot. The Space Fortress's torpedos are launched only when there is a clear shot at the player through all three rings. At this time the player also has his shot at the Space Fortress. Both the Space Fortress and the mines get smarter and faster as the game progresses.

The two player mode is activated when the coins are accepted and the two player button is pushed. Each player plays his turn until his ship is exploded. If a player scores more extra ships than his opponent, he will be allowed to play the extra ships even though his opponent's game is over.

The game of SPACE FORTRESS is not based on time units. The battle rages on until all the player's ships are destroyed. The length of the game depends solely on the skill of the player. It's the age-old challenge of man versus machine.

RECEIVING AND INSTALLATING SPACE FORTRESS

RECEIVING INSPECTION

Your game was shipped in ready-to-play condition. However, after removal of the shipping carton, a brief visual examination is suggested.

Naturally, you'll want to make note of any physical damage to the game cabinet and its external components for freight claim purposes. Considering the quality of the shipping carton, any damage to the exterior would indicate possible interior damage as well.

The interior of the game should also undergo a brief examination for: loose mounting hardware (check to be sure that the major components are still securely mounted); disconnected or loose wires, cables or harnesses; electronic devices loose in their sockets; ect.

At this time the game serial number should be logged. Please remember that the game serial number will be required if you need service from your distributor.

ELECTRICAL REQUIREMENTS

Unless specified otherwise, your game was shipped to operate at 220 VAC. Four other voltage settings are possible. The power supply chassis has a table which shows the voltage options and fusing requirements.

A good earth ground is essential for the proper operation of this game or for that matter any electronic device. Problems with instability and erratic operation of computertype devices can usually be traced to an ineffective ground system. Therefore, plug the game into a properly wired 3 prong outlet. If a 3 prong to 2 prong AC adaptor must be used, an alternate method of grounding the third prong must be used.

INITIAL ADJUSTMENTS

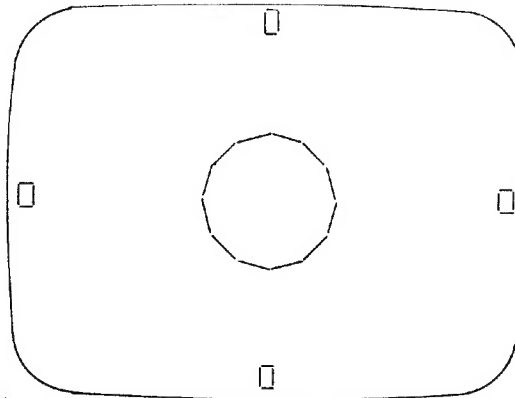
NOTE

When the game is connected to AC power, one of the game sounds may be heard. This is normal.

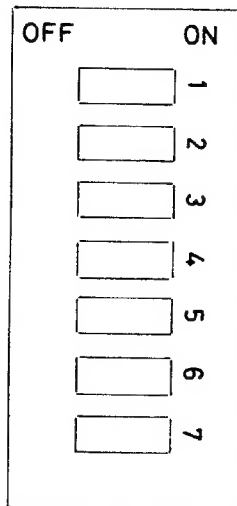
The audio level (volume) can be easily adjusted and THIS IS ACHIEVED BY ROTATION OF THE VOLUME POT. The audio level should compete with other machines "on the floor" to maximize play time.

Display brightness is another easy adjustment. The monitor assembly has several adjustments, but the brightness control is the only one which does not require a " screwdriver" for rotation. Keep the brightness at the correct level for appeal.

TEST
PATTERN



SPACE FORTRESS OPTION SWITCHES
(Located on logic board)



- 1] SHIPS PER GAME
- 2] SEE TABLE 2-1
- 3] CREDITS PER COIN
- 4] SEE TABLE 2-2
- 5] NOT USED
- 6] NOT USED
- 7] ON=NORMAL OPERATION
OFF= TEST PATTERN

SWITCH 2	SWITCH 1	SHIPS / GAME
ON	ON	6
OFF	ON	5
ON	OFF	4
OFF	OFF	3

To adjust coin receptor, operate on the board (coin switches adjustment), moving switches n°3 and n°4 of game board, in "ON" position.
Adjust, as wished, switches on table 2-2

TABLE 2-1

TABLE 2-2
COIN SWITCH ADJUSTMENT

COIN MECHANISM 1

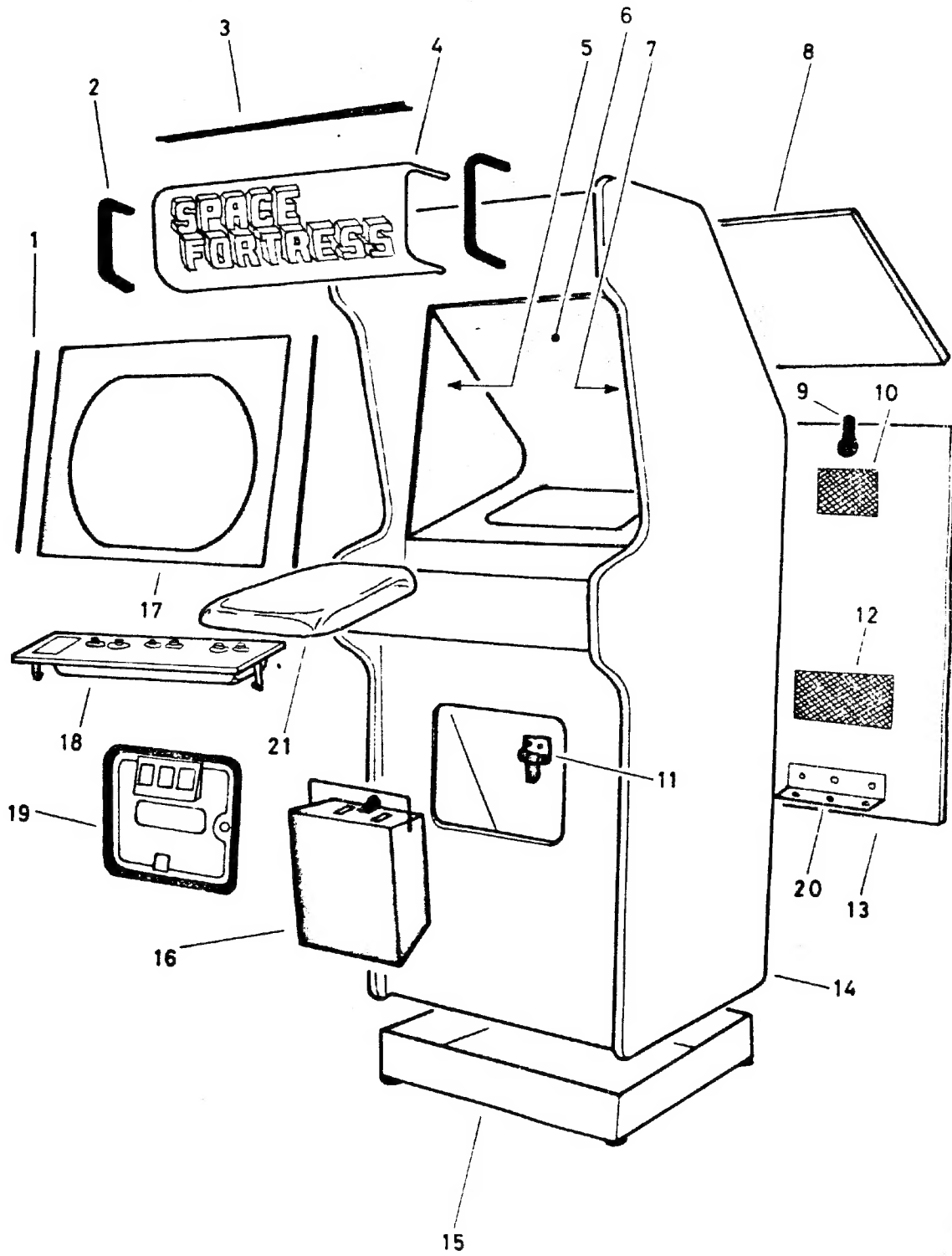
1	2	3	8	
OFF	ON	OFF	OFF	2 COINS - 1 PLAY
OFF	ON	OFF	ON	1 COIN - 1 PLAY
OFF	OFF	ON	ON	1 COIN - 2 PLAYS
OFF	ON	ON	ON	1 COIN - 3 PLAYS
ON	OFF	OFF	ON	1 COIN - 4 PLAYS
ON	ON	OFF	ON	1 COIN - 5 PLAYS
ON	OFF	ON	ON	1 COIN - 6 PLAYS
ON	ON	ON	ON	1 COIN - 7 PLAYS

COIN MECHANISM 2

4	5	6	7	
OFF	ON	OFF	OFF	2 COINS - 1 PLAY
OFF	ON	OFF	ON	1 COIN - 1 PLAY
OFF	OFF	ON	ON	1 COIN - 2 PLAYS
OFF	ON	ON	ON	1 COIN - 3 PLAYS
ON	OFF	OFF	ON	1 COIN - 4 PLAYS
ON	ON	OFF	ON	1 COIN - 5 PLAYS
ON	OFF	ON	ON	1 COIN - 6 PLAYS
ON	ON	ON	ON	1 COIN - 7 PLAYS

ATTENTION :

Do not use other possible combinations.



TAV. 1

1	MV 009	Profilato Cornice
2	MV 034	Guarnizione Nera
3	A 7286	Guarnizione in Alluminio Anodizzato
4	MRB 388	Pannello ad "U" Serigrafato " Space Fortress"
5	MRB 402	Scenario Verticale Sinistro
6	MRB 404	Scenario
7	MRB 403	Scenario Verticale Destro
8	FB 075	Sportello Superiore
9	B 7091	Serratura
10	A 7295	Rettangolo Rete Stirata (130 x 250)
11	B 6616	Squadretta Fissaggio Cassetta Monete
12	A 7294	Rete Stirata (180 x 180)
13	FB 074	Sportello Posteriore
14	MRB 378	Mobile Serigrafato
15	FB 071	Zoccolo
16	B 7154	Cassatta Monete
17	MRB 359	Vetro serig. " Space Fortress"
18	C 8146	Pannello Comandi assemblato a pulsanti
19	C 8109	Sportello per Gettoniere
20	A 7260	Angolare Rinforzo Mobile
21	MRB 399	Schermatura in Plexiglass per Cinescopio

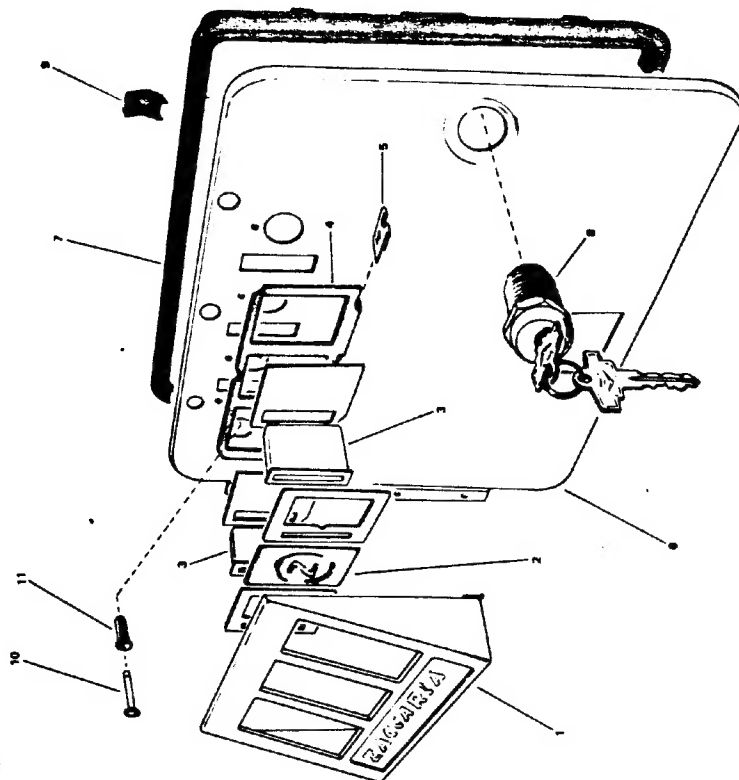
PIASTRINE SERIGRAFATE & Introduction Monets

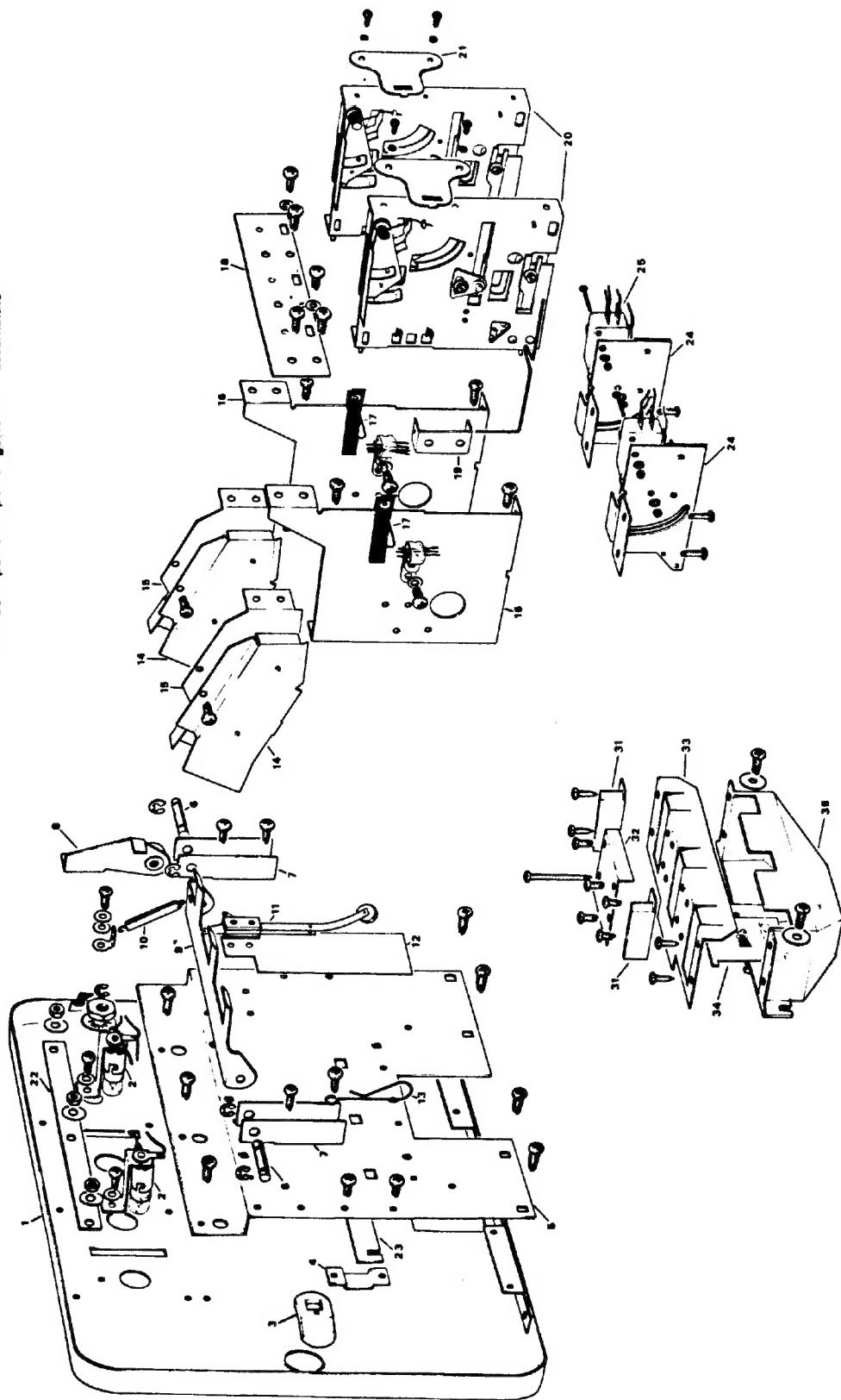
AUSTRIA		AUSTRIA		AUSTRIA		AUSTRIA	
20	CENTS PLAY	5	OS	10	OS	5	Frs
p. ser. B 5056 n. m. A 5007		p. ser. B 5045 n. m. A 5008		p. ser. B 5047 n. m. A 5007		p. ser. B 5035 n. m. A 5008	
BELGIO		BELGIO		BELGIO		BELGIO	
10	Frs	5	Frs	10	Frs	10	Frs
p. ser. B 5034 n. m. A 5007		p. ser. B 5035 n. m. A 5008		p. ser. B 5047 n. m. A 5007		p. ser. B 5034 n. m. A 5007	
FRANCIA & SVIZZERA		FRANCIA & SVIZZERA		FRANCIA & SVIZZERA		FRANCIA & SVIZZERA	
1	Kr	5	Kr	10	Kr	1	Fr
p. ser. B 4074 n. m. A 5007		p. ser. B 5065 n. m. A 4401		p. ser. B 5066 n. m. A 5007		p. ser. B 5024 n. m. A 5008	
GERMANIA		GERMANIA		GERMANIA		GERMANIA	
1	DM	2	DM	5	DM	100	Yen
p. ser. B 4059 n. m. A 5008		p. ser. B 4060 n. m. A 5007		p. ser. B 4041 n. m. A 5007		p. ser. B 5052 n. m. A 4398	
INGHILTERRA		INGHILTERRA		INGHILTERRA		INGHILTERRA	
10 ^P		50 ^P		100	LIRE	200	LIRE
p. ser. B 4062 n. m. A 5007		p. ser. B 4091 n. m. A 4401		p. ser. B 5001 n. m. A 5007		p. ser. B 6136 n. m. A 5242	
ITALIA		ITALIA		ITALIA		ITALIA	
1	DM	2	DM	5	DM	100	Yen
p. ser. B 4059 n. m. A 5008		p. ser. B 4060 n. m. A 5007		p. ser. B 4041 n. m. A 5007		p. ser. B 5052 n. m. A 4398	
JUGOSLAVIA		JUGOSLAVIA		JUGOSLAVIA		JUGOSLAVIA	
1	DIN	2	DIN	1	DIN	2	DIN
p. ser. B 4081 n. m. A 5008		p. ser. B 4082 n. m. A 5007		p. ser. B 4081 n. m. A 5008		p. ser. B 4082 n. m. A 5007	
LIBANO		LIBANO		LIBANO		LIBANO	
25	PL	50	PL	1	G	2	FORINT
p. ser. B 5059 n. m. A 5008		p. ser. B 5058 n. m. A 5007		p. ser. B 4065 n. m. A 5008		p. ser. B 6139 n. m. A 5008	
OLANDA		OLANDA		OLANDA		OLANDA	
1	G	2	FORINT	25¢		50¢	
p. ser. B 4065 n. m. A 5008		p. ser. B 6139 n. m. A 5008		p. ser. B 5046 n. m. A 5008		p. ser. B 5061 n. m. A 5007	
UNGHERIA		UNGHERIA		UNGHERIA		UNGHERIA	
1	G	2	FORINT	25¢		50¢	
p. ser. B 4065 n. m. A 5008		p. ser. B 6139 n. m. A 5008		p. ser. B 5046 n. m. A 5008		p. ser. B 5061 n. m. A 5007	
USA & CANADA		USA & CANADA		USA & CANADA		USA & CANADA	
1	DIN	2	DIN	1	DIN	2	DIN
p. ser. B 4081 n. m. A 5008		p. ser. B 4082 n. m. A 5007		p. ser. B 4081 n. m. A 5008		p. ser. B 4082 n. m. A 5007	



C 8109
SPORTELO PORTA
GETTONIERE
ASSEMBLATO

TAV. 3





TAV. 3

C 8109 SPORTELLI PER GETTONIERE ASSEMBLATO

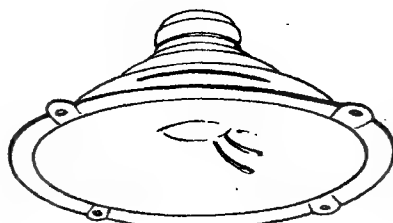
1	ACB 116	Frontalino Sportello con Cerniera
2	A 5009	Piastrina con Marchio
3	A 6008	Guida Moneta in Plastica
4	A 7005	Componente Fissaggio Accessori
5	A 4383	Piastrina Semidoppia
6	B 7194	Sportello con Cerniera
7	A 7236	Cornice in Alluminio Pressofuso
8	B 7153	Serratura
9	A 4460	Staffa Fissaggio Cornice
10	A 4031	Pulsante Scarto Moneta
11	A 4032	Componente per Pulsante

TAV. 4

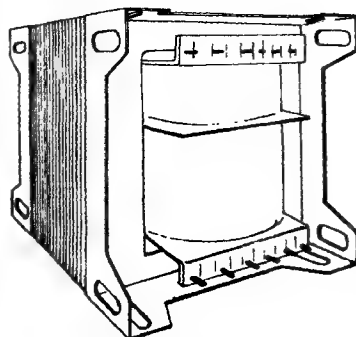
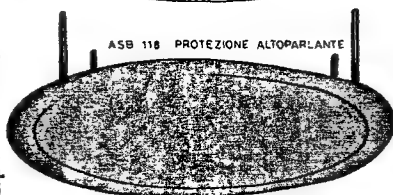
1	B 7194	Sportello con Cerniera compl. di Accessori
2	B 5029	Porta Lampada Alto Sportello
3	A 4328	Leva per Serratura Sportello Anteriore
4	A 5002	Fermo Barra Arresto Moneta
5	A 7002	Piastra Supporto Gettoniera
6	A 4005	Fermo per Cavallotto Sportello
7	A 6001	Cavallotto Sportello
8	B 6001	Leva con Boccola
9	A 6002	Leva di Scarto Gettoniera
10	A 5201	Molla richiamo Leva di Scarto
11	B 9015	Pacco Lamellare Tilt
12	A 5205	Cartoncino Isolatore Sportello
13	A 5021	Ferretto Porta Chiave Sportello
14	A 7009	Scorrimoneta Maschio
15	A 7008	Scorrimoneta Femmina
14+15	B 6076	Scorrimoneta Assemblato
16	B 7006	Supporto Gettoniera
17	A 5252	Forcellina Fissaggio Gettoniera
18	A 5014	Piastrina Accoppiamento Supp. Gettoniera
19	A 5015	Componente per Asta Arresto Moneta
20	B 7043	Gettoniera L. 50

20	B 7084	Gettoniera I. 100
"	B 7175	" I. 200
"	B 7092	" 25 ¤
"	B 7096	" 5 F
"	B 7097	" 10 F
"	B 7098	" 5 P
"	B 7099	" 10 P
"	B 7147	" 50 P
"	B 7111	" 0,50 pfg
"	B 7112	" 1 DM
"	B 7113	" 2 DM
"	B 7114	" 5 DM
"	B 7128	" 1 FS
"	B 7129	" 2 FS
"	B 7148	" 10 Fr Belgi
"	B 7233	" 5 Dinari
"	B 7234	" 10 Dinari
21	A 5114	Piastrina Fissaggio Gettoniera
22	A 5006	Asta per Frontalino
23	A 5001	Barra Arresto Moneta
24	B 6109	Piastra Porta Micro
25	B 5053	Micro Nero
"	B 5054	Micro Rosso
"	B 5055	Micro Bianco
31	A 5012	Squad. a 2 fori
32	A 5010	Squad. a 4 fori
33	A 6009	Copertura per Raccoglitore Monete
34	A 5011	Cancelletto
35	AS1028	Raccoglitore in Plastica

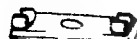
CE 2018 ALTOPARLANTE



ASB 118 PROTEZIONE ALTOPARLANTE



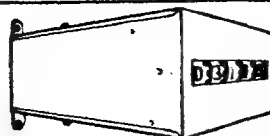
C 6128 TRASFORMATORE 2 C 1012



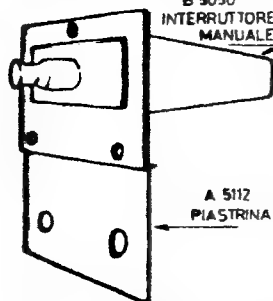
B 7055 PORTAFUSIBILE



C 8076 FILTRO RETE 1 AMP.

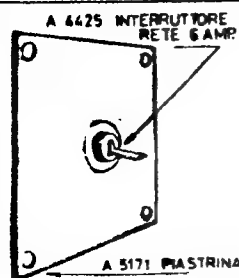


B 6110 CONTATORE 6 V d.C.



B 5050
INTERRUTTORE
MANUALE

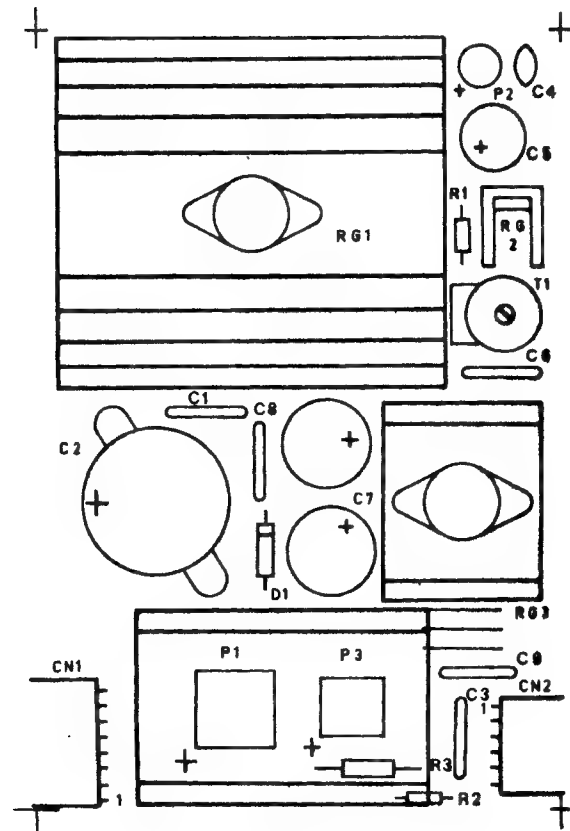
A 5112
PIASTRINA



A 4425 INTERRUTTORE
RETE 6 AMP.

A 5171 PIASTRINA

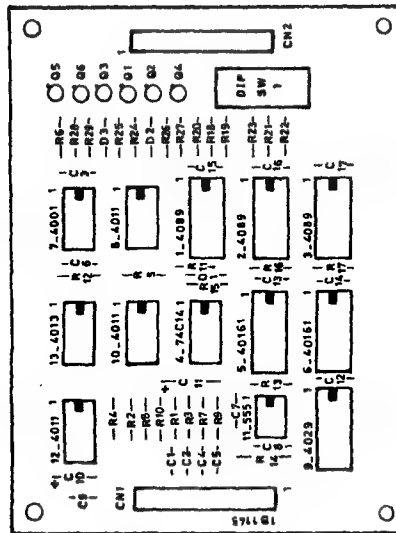
CEC 075 POWER BOARD R.C. 1B1126

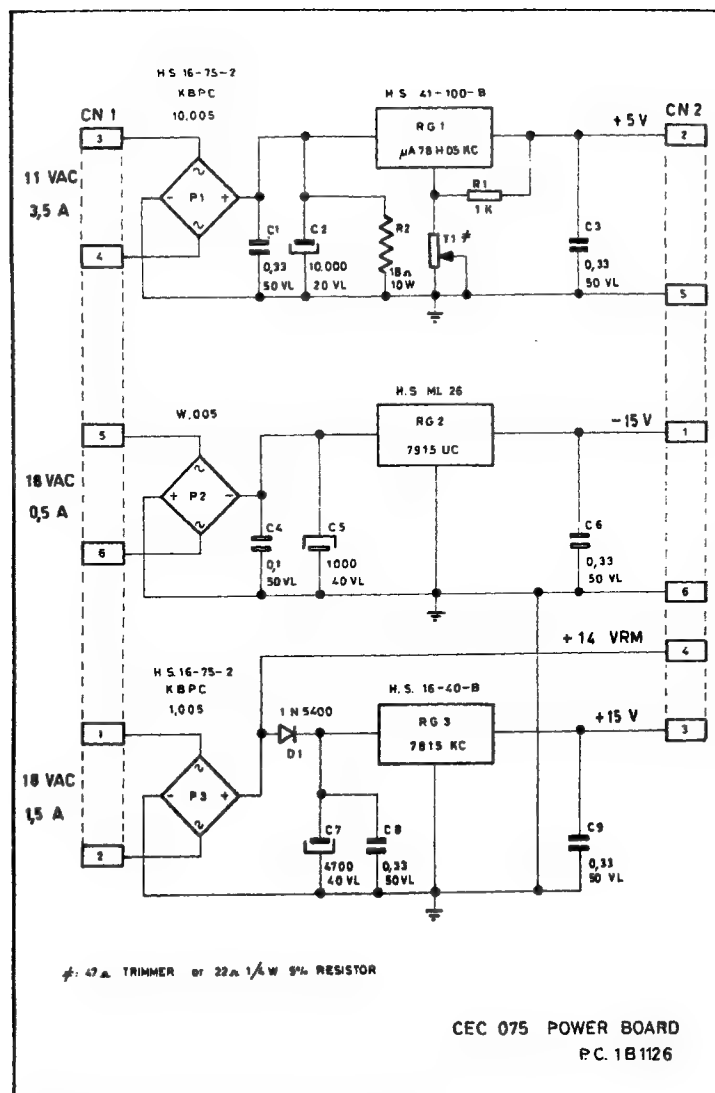


PC 1B 1126

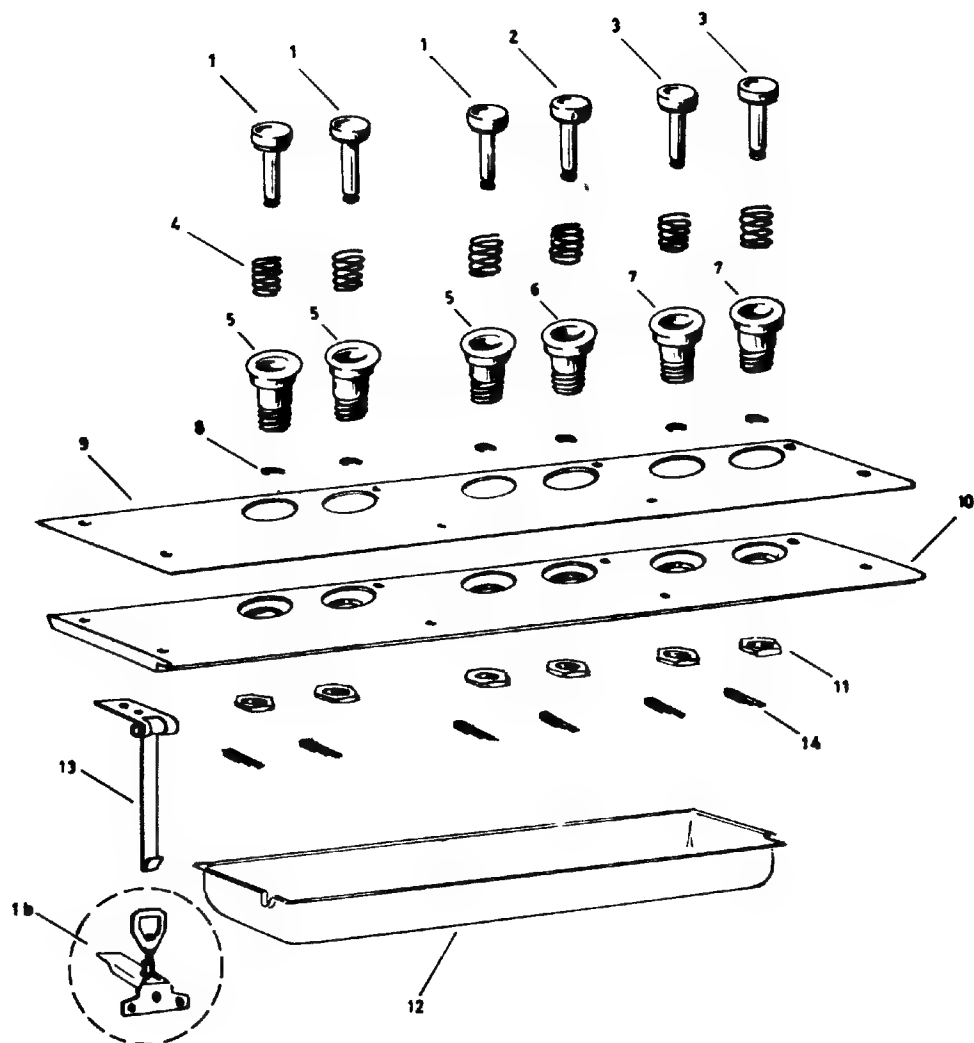
Component list

ITEM No	PART DESIGNATION	CODE PART No	DESCRIPTION	REQ No
1	PC 1	CE 2070	Printed Circuit 1B 1126	1
2	P 1	CE 1405	50V. 10 AMP Rect. Brid. (KBPC 10-005)	1
3	P 2	CE 1233	50V. 1 AMP Rect. Brid. (W-005)	1
4	P 3	CE 1276	50V. 3 AMP Rect. Bridge (KBPC 1-005)	1
5	RG 1	CE 1238	+5V. 5 AMP Voltage Regulator (MA 78H05KC)	1
6	RG 2	CE 1750	-15V. 1 AMP Voltage Regulator (MA 7515 UC)	1
7	RG 3	CE 1749	+15V. 1 AMP Voltage Regulator (MA 7815 KC)	1
8	D 1	CE 1299	1N 5400 Diode	1
9	CN1	CE 1332	6 Pin Modu 1 Male Connector	1
10	CN 2	CE 1361	8 Pin Modu 1 Male Connector	1
11	HS 1	CE 1566	Heat Sink 16/75/2	1
12	HS 2	CE 1278	Heat Sink 41/100/R	1
13	HS 3	CE 1099	Heat Sink WL 26 T0-220	1
14	HS 4	CE 1529	Heat Sink 16/40/B	1
15	C 1-3-6-8-9	CE 1261	0.33MF 50V. Polias. Film Capac.	5
16	C 2	CE 1384	10.000MF 16V. Electr. Cap. Sin. Ended	1
17	C 4	CE 1005	0.1MF 50V. Ceramic Capacitor	1
18	C 5	CE 1580	1.000MF 50V. Elec. Cap. Sin. End.	1
19	C 7	CE 1579	2.200MF 50V. Elec. Cap. Sing. End.	2
20	R 1	CE 1170	1 KOHM 1/4W 5% Carbon Resistor	1
21	R 2	CE 1701	18 OHM 20W 10% Wire Resistor	1
22	T 1		47 OHM 1 Turn Vertical Trimmer (Commonly mounted 22 OHM 1/4W 5% Carbon Resistor)	1





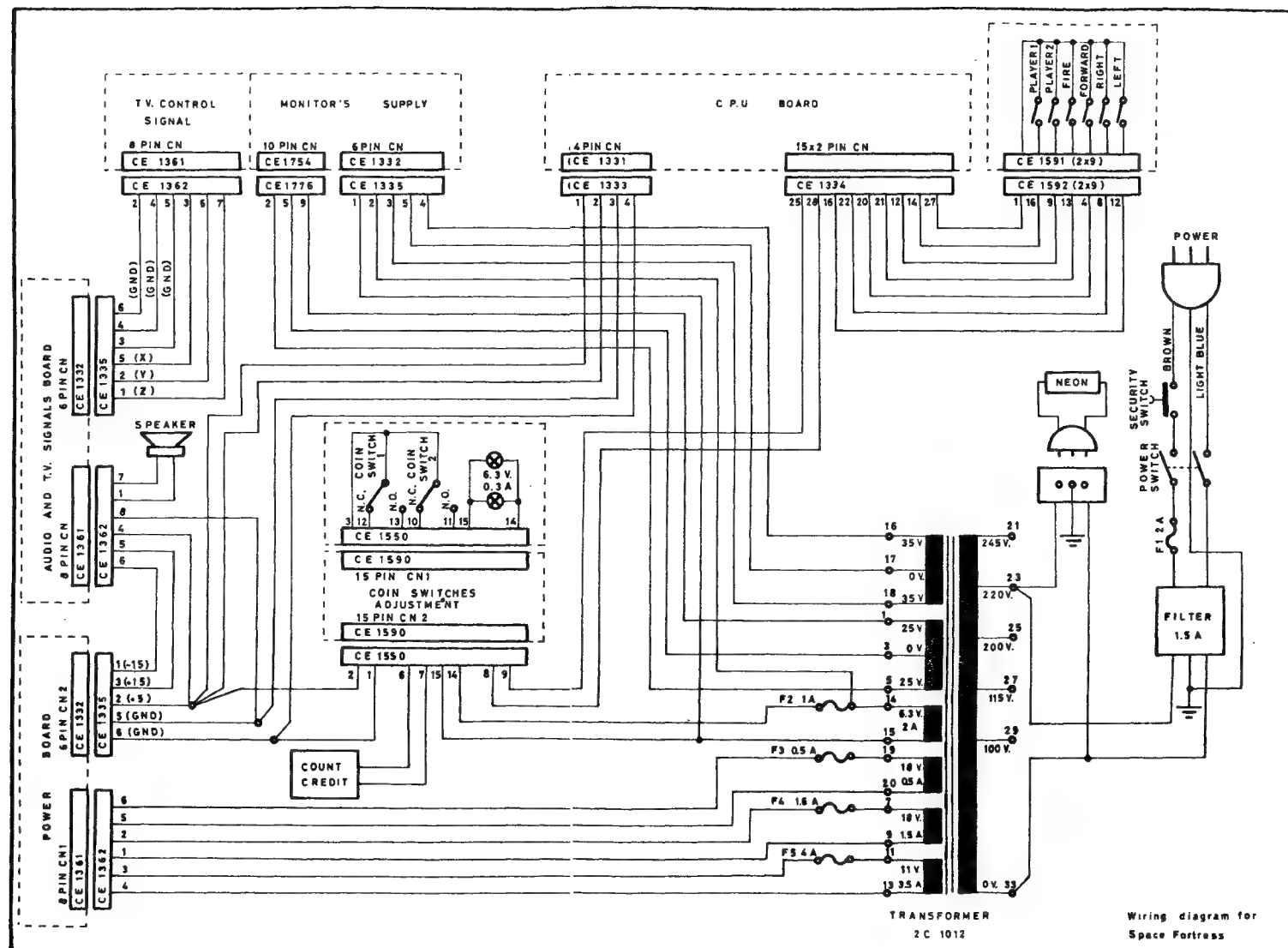
C 8146 Pannello comandi a 6 pulsanti



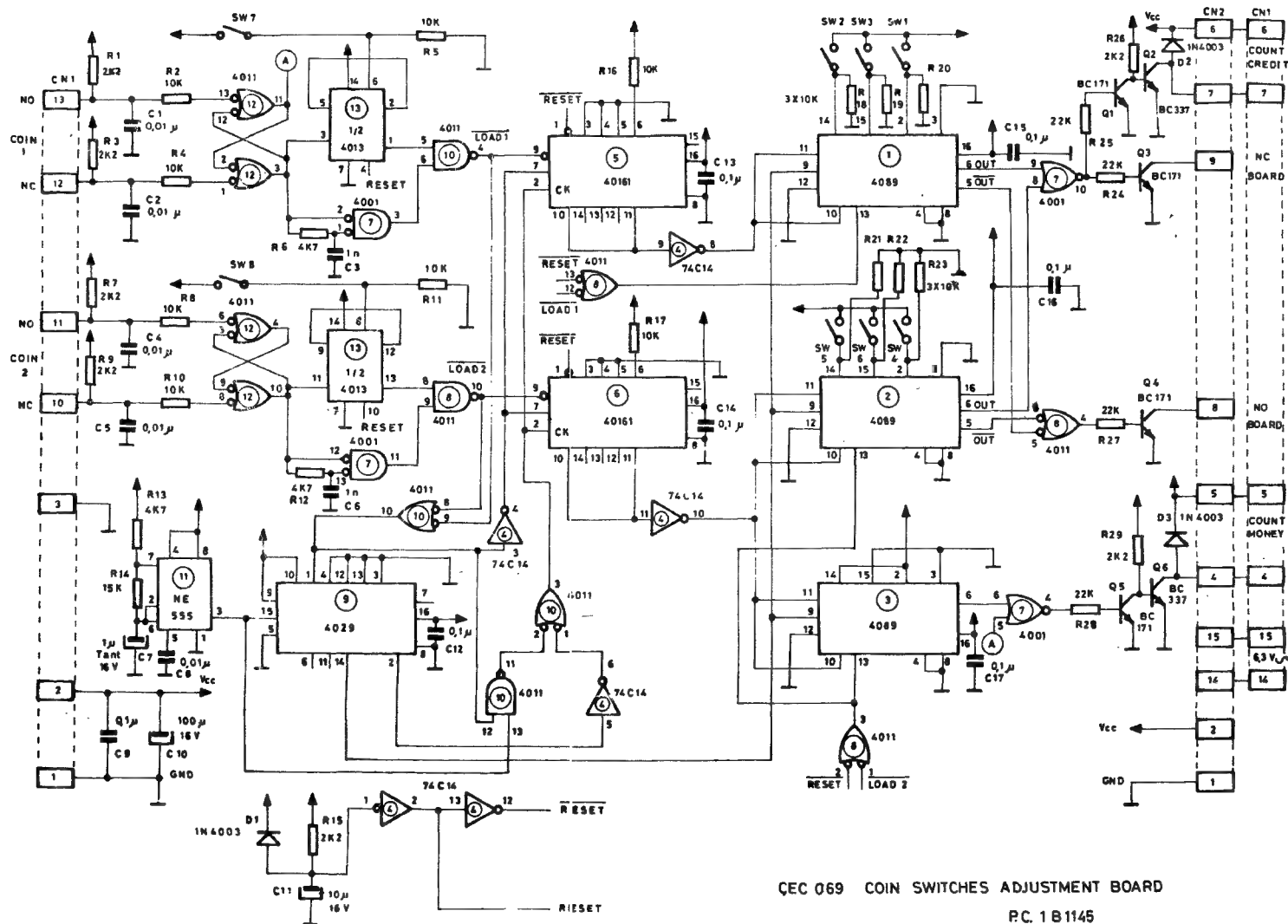
TAV. 2

C 8146 PANNELLO COMANDI A 6 PULSANTI

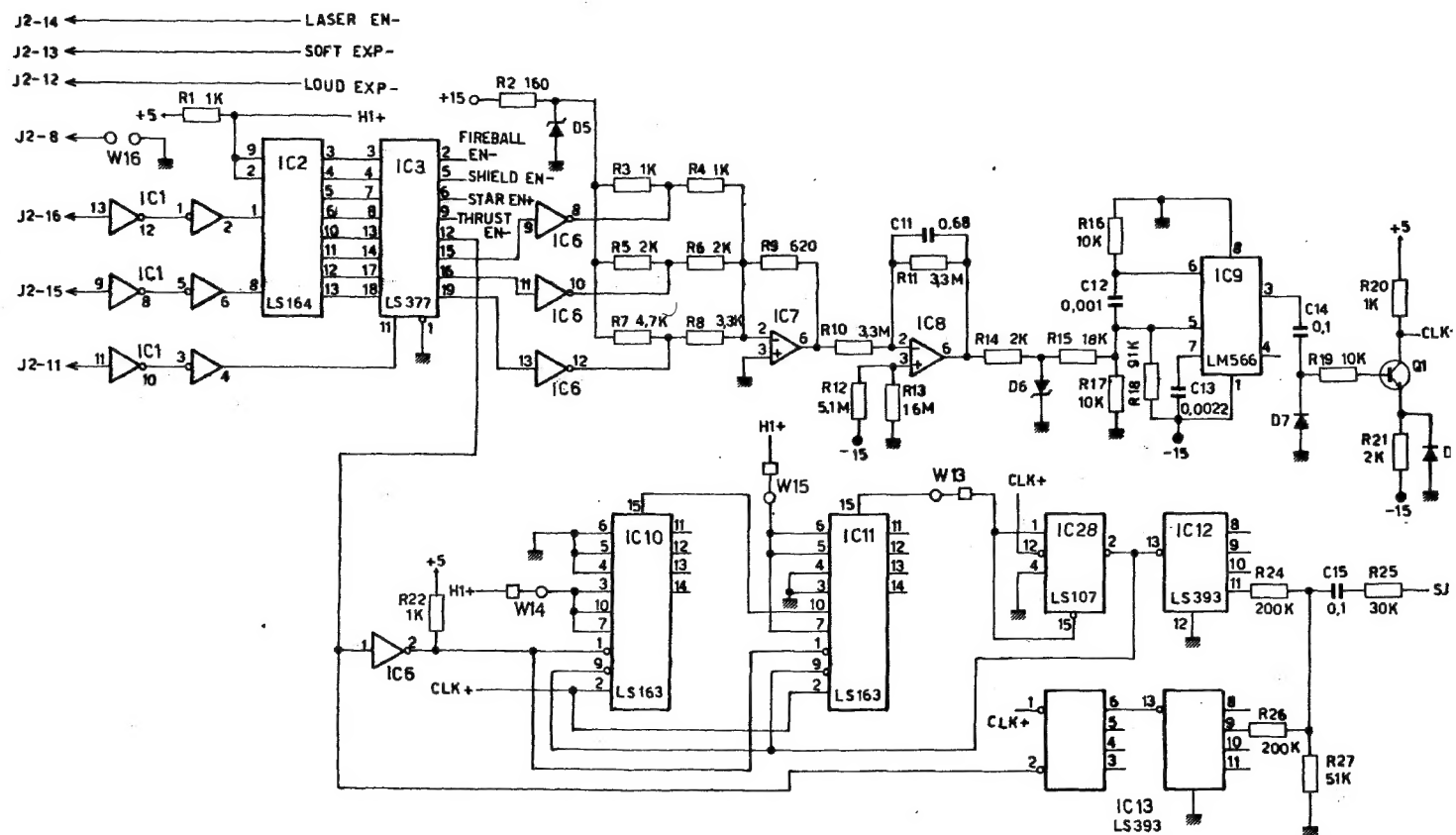
1	B 6113	Pulsante Verde
2	B 6130	Pulsante Rosso
3	B 6114	Pulsante Bianco
4	A 4272	Molla Richiamo Pulsante
5	A 5213	Corpo Pulsante Verde
6	A 5225	Corpo Pulsante Rosso
7	A 5211	Corpo Pulsante Bianco
8	A 4202	Anello Din mm. 6
9	MRE 384	Mascherina Comando serigrafata
10	FB 085	Tavoletta in Legno
11	A 5214	Dado Ferro Zinc. 16 MA Fiss. Corpo Pulsante
12	A 7194	Scatola Protezione Pacchi Lamellari
13	B 6118	Cerniera con Tirante
14	B 9021	Pacco Lamellare
1b	B 6115	Bloccaggio a Leva Regolabile



Wiring diagram for
Space Fortress



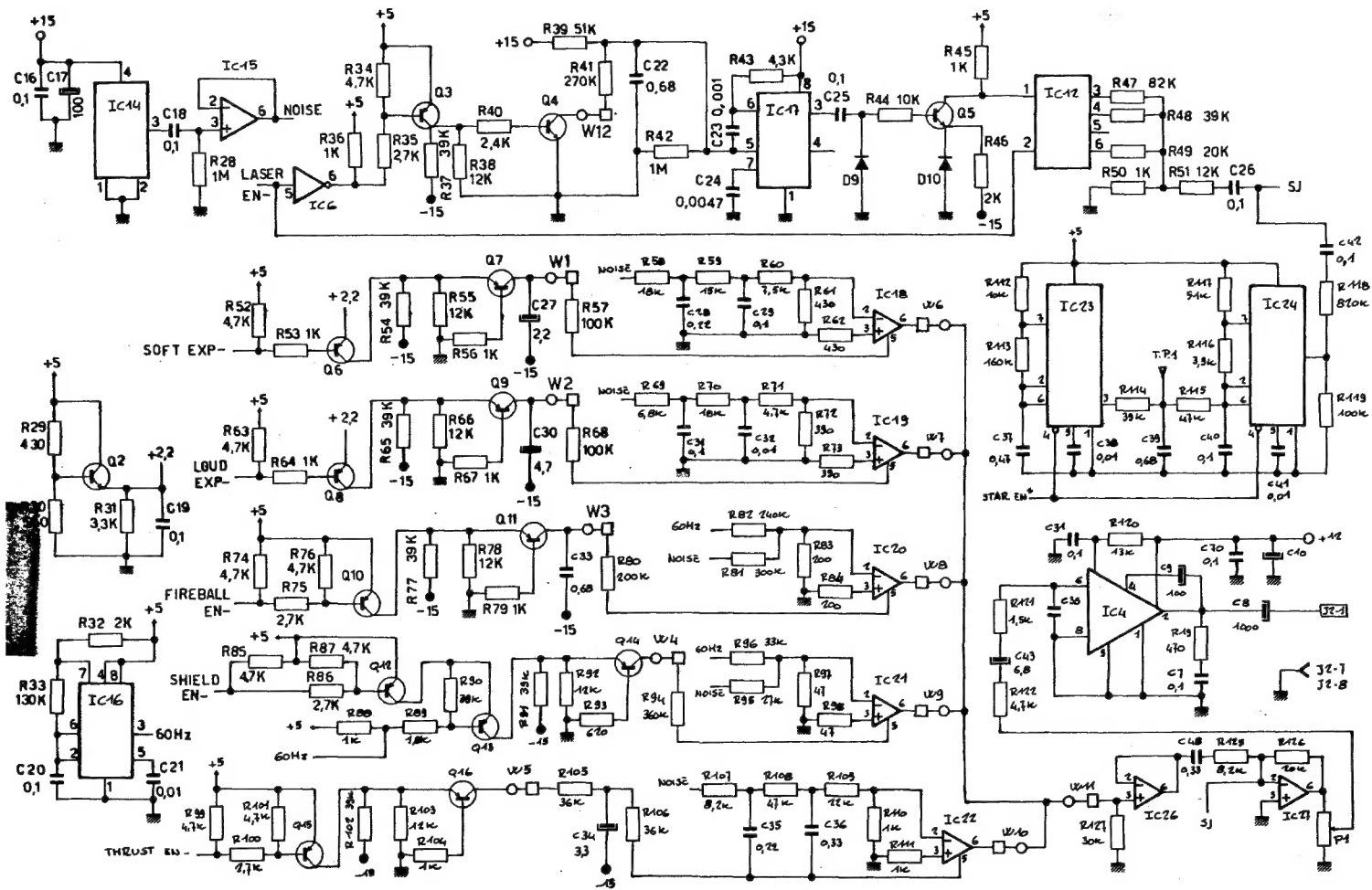
ÇEC 069 COIN SWITCHES ADJUSTMENT BOARD
PC. 1 B1145

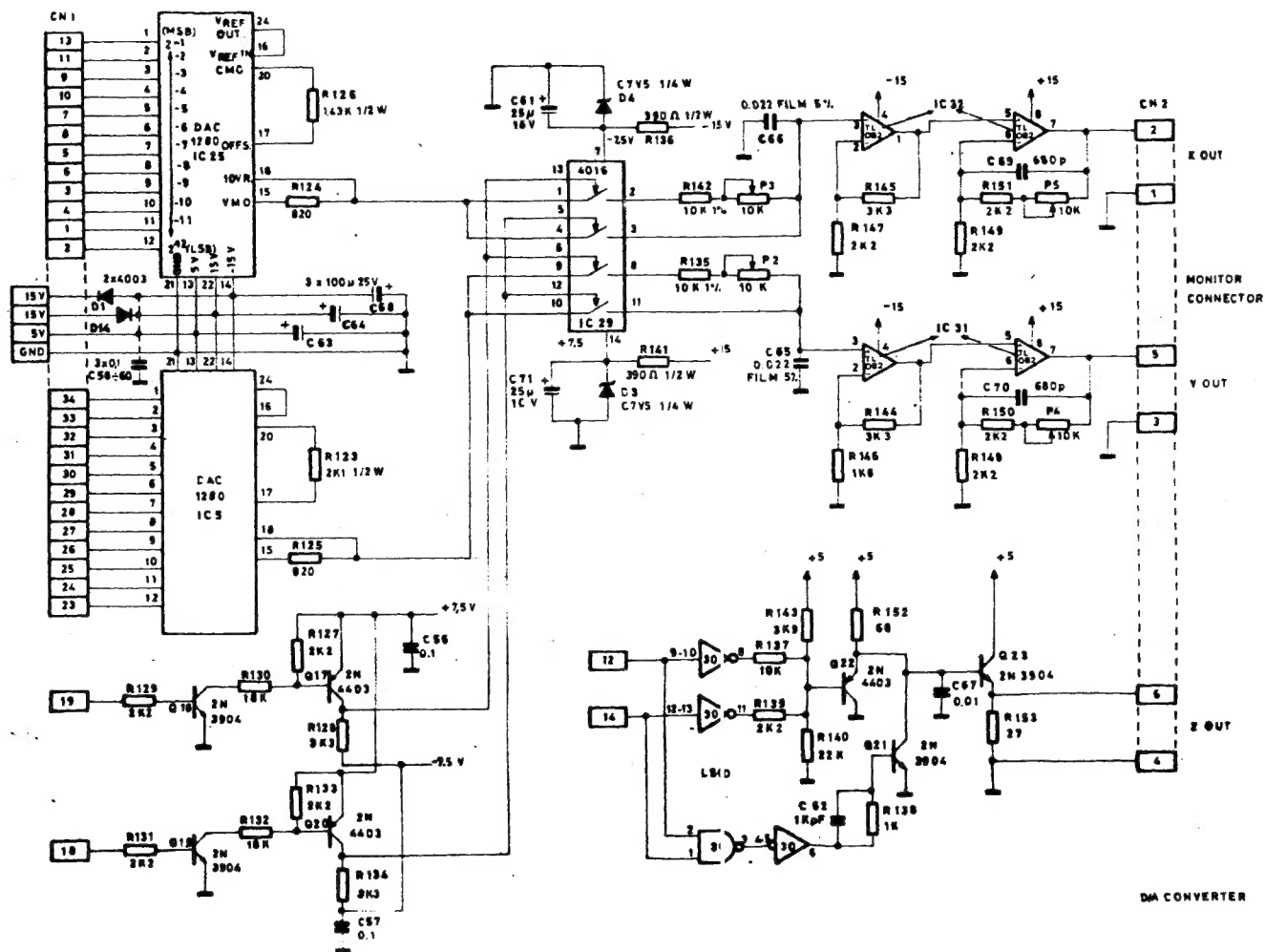


IC1 = 7414

IC6 = 7406

IC7-8 = 7400





MONITOR X-Y

